

7 February 1961

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TO:

FROM:

SUBJECT: Requirements for Assembly Area

OBJECTIVE:

The objective of the assembly program is to preserve, during the assembly operation, the super-precision* designed and manufactured into the component parts; to insure the advancement in the state of the art that is required for acceptable system performance.

Completion of the assembly should reflect the highest quality of workmanship and assurance of the maximum degree of reliability.** In order to accomplish this, the latest assembly techniques must be employed and proper facilities must be provided. The facilities as proposed are the minimum requirements to provide this necessary service.

OBSERVATIONS:

Leading precision instrument manufacturers have been investigating causes of instrument failures and have reached the conclusion that a good percentage of failures was caused by dirt picked up during the assembly operation. In order to overcome this problem the manufacturers now perform their assembly operations in dust-free and super-clean rooms.

In planning our assembly operation an inspection of the assembly area was performed and the following conditions were observed:

1. A continuous flow of traffic in this area is presently unavoidable.
2. Full ashtrays, empty coffee cups, old newspapers, steel wool, etc. were found on work benches being used for precision electronic assemblies.
3. Exhaust from the super-clean room empties into the center

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Concerning micro-inches.

** Reference memo dated 31 August 1960, Subject - "Quality of Engineering Products" (copy attached)

of the electronics assembly area.

4. Dust gathering pipes, beams, ducting, etc. hang directly over the electronics assembly area.

5. The super-clean room has no ante-room for removing dirt from equipment or personnel prior to entering the clean room.

6. Assemblies completed and sealed in the clean room will have to be removed to an unclean area for final assembly and may partially defeat the purpose of the clean room.

REQUIREMENTS:

The next step in planning our assembly operation was to find ways of eliminating the above conditions. The results of our investigation and planning indicated the necessity for modifying the complete assembly area. The facility modification drawing was completed and submitted for approval. The drawing showed the addition and/or modification of the following:

1. Entry Room

The purpose of the entry room is to provide authorized personnel with lockers for storing P-E supplied lintless uniforms, a vacuum shoe cleaner for removing dirt from the bottom of their shoes and then to provide entrance to the other assembly areas.

2. Platform Assembly Area

The door leading from the entry room enters into the platform assembly area. This area must have double doors in order to provide clearance for the platform assembly and its supporting structure when removal from this assembly area is necessary.

This area can be designated as the final system assembly area, sub-assemblies from the other clean areas will flow into this area for assembly on the platform.

Equipment in this area other than the platform structure will be a portable work bench, three supply cabinets, a few stools and two step platforms (5 steps).

3. Ante-Room

The ante-room leads from the platform assembly area to the super-clean room. The ante-room contains the ultra-sonic cleaning equipment, two assembly hoods and a work bench.

Small opto-mechanical assemblies will be completed in this room. All completed assemblies will be cleaned and sealed in polyethylene bags.

Before entering the super-clean room plastic shoe covers will be donned in this room.

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4. Super-Clean Room

The super-clean room is in existence and will be used for assembling all critical sub-assemblies. Critical components requiring assembly and disassembly will be handled in this room.

Where size permits, testing of critical assemblies will be performed in this room.

Two assembly hoods, a surface plate and work bench will be placed in this room.

5. Test Tunnel

The test tunnel will be used for assembling, aligning and testing the optical benches. The tunnel will have collimators and test equipment for assembling two units simultaneously.

In order to obtain additional opto-mechanical assembly area, the tunnel must be modified as shown on the floor plan layout.

6. Transport Assembly Area

The area between the tunnel and ante-room will be used for transport component assembly on a large fixture. A work bench will be placed in this area.

This area will have double doors and will allow for future expansion into another platform assembly area.

7. Electronics Assembly Area

The remaining assembly area will be devoted exclusively to the electronic assembly of amplifiers, power supplies, etc. Sub-assembly testing will be performed here.

This area will contain work benches, cabinets and an assembly hood.

CONCLUSION:

In order to improve working habits, increase efficiency, improve quality of workmanship and to obtain maximum reliability of assembled components the proposed facility modification is an absolute necessity. Completion of this modification will undoubtedly affect prototype delivery.

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